

What Is Claimed Is:

- 5 1. A method of converting solid fossil fuels, including coal, or oil tars obtained by distillation of coal, turf, grass, glucose, rubber, sapropel, sapropelites, slates, and wood, to petroleum, comprising:

isolating a starting microorganism capable of said conversion;

isolating from the starting microorganism the genes responsible for the conversion ability;

transfecting the genes into a host microorganism.

- 10 2. A method of converting organic material or inorganic material (including such contained in water or salt water) petroleum, solid fossil fuels, including coal, as well as oil tars obtained by distillation of coal, turf, grass, glucose, rubber, sapropel, sapropelites, slates, and wood, into carbon hydrogen or oxygen, comprising:

15 isolating a starting microorganism capable of said conversion;

isolating from the starting microorganism the genes responsible for the conversion ability;

transfecting the genes into a host microorganism.

- 20 3. The method of claim 1 wherein the starting microorganism is *Thiobacillus aquaesullis* 4255 and 389, *Thiosphaera pantotrophica* 356, *Thiosphaera pantotrophica* 2944, *Thiobacillus thiooxidans* 55, mutants and variants thereof, or a microorganism which exists naturally in water including deep water.

4. The method of claim 1 or 2 wherein, after transfection, the host microorganism is capable of faster growth, reproduction, enhanced survivability in the production environment, or more production per unit nutrient or starting fossil fuel or oil tar, than is the starting microorganism.

5 5. The method of claim 4 wherein the host microorganism can exist in salt water or fresh water, can metabolize glucose or other nutrient media, can exist in rocky, sandy or sand/water environments, can survive heat, cold, or acidic or basic environments, can oxidize sulfur, or can exist in aerobic or anaerobic conditions.

10 6. The method of claim 1 or 2 wherein the genes responsible for conversion are isolated by subtractive hybridization.

7. The method of claim 6 wherein the subtractive hybridization is performed by representational difference analysis.

15 8. The method of claim 1 or 2 wherein before transfection, the genes are selectively altered, and following transfection with such selectively altered genes, the host microorganisms with characteristics best suited to commercial production of petroleum are selected.

9. A method of improving converting of solid fossil fuels, including coal, or oil tars obtained by distillation of coal, turf, grass, glucose, rubber, sapropel, sapropelites, slates, and wood, to petroleum, comprising:

20 isolating a starting microorganism capable of said conversion;
isolating from the starting microorganism an oligonucleotide probe
complementary to a gene responsible for the conversion ability;

placing the probe under hybridizing conditions in contact with amplicons
from other microorganisms suspected or being capable of said conversion;
isolating amplicons which hybridized; and
transfecting the isolated amplicons into a host microorganism and
5 determining whether productivity improved.

10. A method of improving converting of organic material or inorganic material
(including such contained in water or salt water) petroleum, solid fossil fuels,
including coal, as well as oil tars obtained by distillation of coal, turf, grass, glucose,
rubber, sapropel, sapropelites, slates, and wood, into carbon hydrogen or oxygen,
10 comprising:

isolating a starting microorganism capable of said conversion;
isolating from the starting microorganism an oligonucleotide probe
complementary to a gene responsible for the conversion ability;
placing the probe under hybridizing conditions in contact with amplicons
15 from other microorganisms suspected or being capable of said conversion;
isolating amplicons which hybridized; and
transfecting the isolated amplicons into a host microorganism and
determining whether productivity improved.

11. A method of converting carbon, hydrogen and oxygen into fossil fuels, including
20 coal and petroleum, comprising:

isolating a starting microorganism capable of said conversion;
isolating from the starting microorganism the genes responsible for the
conversion ability;

transfecting the genes into a host microorganism.

12. The method of claim 11 wherein, after transfection, the host microorganism is capable of faster growth, reproduction, enhanced survivability in the production environment, or more production per unit nutrient or starting fossil fuel or oil tar, than is the starting microorganism.

13. The method of claim 11 wherein the host microorganism can exist in salt water or fresh water, can metabolize glucose, rubber, grass, or other nutrient media, can exist in rocky, sandy or sand/water environments, can survive heat, cold, or acidic or basic environments, can oxidize sulfur, or can exist in aerobic or anaerobic conditions.

14. The method of claim 11 wherein the genes responsible for conversion are isolated by subtractive hybridization.

15. The method of claim 14 wherein the subtractive hybridization is performed by representational difference analysis.

16. The method of claim 16 wherein before transfection, the genes are selectively altered, and following transfection with such selectively altered genes, the host microorganisms with characteristics best suited to commercial production are selected.